Register No.:

356

October 2017

Time – Three hours
(Maximum Marks: 75)

[N.B: (1) Q.No. 8 in PART – A and Q.No. 16 in PART – B are compulsory. Answer any FOUR questions from the remaining in each PART – A and PART – B

(2) Answer division (a) or division (b) of each question in PART – C.

(3) Each question carries 2 marks in PART – A, 3 marks in Part – B and 10 marks in PART – C.]

PART – A

1. What are the pressure and temperature of STP and NTP conditions?
2. What is point function? Give examples.
3. What is throttling process?
4. What are the assumptions made in deriving air standard efficiency?
5. Write down the steady flow energy equation.
6. Compare the properties, adhesion and cohesion.
7. List out the various types of orifices and its applications.
8. State Bernoulli's theorem.

PART – B

9. What is thermodynamic equilibrium?
10. How much heat is required to heat 5kg of steel with specific heat capacity 480 J/kgK of 15°C to 100°C?
11. Draw P-V and T-s diagram of polytrophic process.
12. What are the assumptions made in steady flow energy equation?
13. Define the properties, specific weight and specific volume.
14. Define Pascal's law.
15. Write the formula for discharge through venturimeter.
16. Define hydraulic gradient line.

[Turn over.....

PART – C

17. (a) (i) A closed system receives 100kJ of heat and performs 135kJ of work. Calculate the change in internal energy.

(ii) A mass of 10kg at 200°C losses 715.5kJ of heat. What is the final temperature of mass? Specific heat=477 J/kgK.

(Or)

(b) Explain the various types of thermodynamic systems with examples.

18. (a) A gas having molecular weight 28 occupies a volume of $0.15m^3$ at a pressure of 2 bar and a temperature of 20°C. Find the mass, volume and density of the gas at 0°C and 1 bar pressure.

(Or)

(b) 1 kg of air is compressed according to the law $PV^{1.3}=C$ from 1 bar and 20°C to 20 bar. Calculate (i)Change in entropy (ii)Final temperature (iii)Work done. Take $C_p=1.005kJ/kgK$, $C_v=0.72kJ/kgK$.

19. (a) An ideal heat engine working on Carnot cycle converts 20% of heat into work. When the temperature of the sink is reduced by 80°C, its efficiency is doubled. Determine the temperature of source and sink.

(Or)

(b) Explain the working principle, merits and demerits of closed cycle gas turbine with neat sketch.

20. (a) A differential mercury manometer is used to measure pressure difference of an oil of relative density 0.85 in a pipeline. The difference in height between the two gauge points is 1m. The difference in mercury level in the manometer tube is 0.5m. Find the difference in pressure in terms of meter of oil and in kN/m^2.

(Or)

(b) Explain the working of Bourdon tube pressure gauge with a neat sketch.

21. (a) Derive the Darcy Weisbach equation for the loss of head due to friction.

(Or)

(b) The ratio between the length and diameter of pipe is 600. Determine the head lost due to friction using Chezy's formula, when the velocity of water is 5m/s. Take Chezy's constant as 98.
